which the instrument rests, should be made longer than in the figure so that the block to which the membrane is attached may be farther off from the wheels.

THE GRASSES.

BY W. W. BAILEY.

THE earliest, as well as the latest sign of vegetable life is, perhaps, afforded by the grasses, whose green blades form the sward which we all so much admire. Did it ever occur to all our readers that these humble plants which form our out-door carpet or which are cultivated for forage, have flowers, often as beautiful in their way as any of their proud associates? All are aware that the tasselled heads and silky plumes of the Indian-corn are beautiful, and gaze with delight upon a sea of grain when rippled by the gentler breezes or thrown into billows by the more wrathful. When another season shall present the opportunity, let those who are beginning timidly to woo Dame Nature, examine more closely the beauty which the grasses offer, and we think that they will thank us for the advice. To study them understandingly, it will be necessary to be provided with an ordinary field microscope of one or two lenses, and if in addition, the observer happens to possess a compound instrument for the examination of the minuter parts, he will find it very serviceable.

A few words as to the structure of grasses, and the points in which they differ from other plants may be of interest, and while speaking of them, we will add a word about the sedge family,—their very next of kin. Both of these natural orders are so large, and the species so varied, that the study of them has become a specialty, and many men devote their whole lives to arranging and simplifying our knowledge of the classes, learning their habits, and ascertaining how the useful species may be made more serviceable and the valueless eradicated. Although we are not one of these specialists, we will try to give a familiar, and at the same time an accurate account of the structure of both grasses and sedges, referring, when in doubt, to those whose word is law.

The sedge family comes first in order, and includes the sedges proper, the bulrushes, cotton-grasses, and many other more or less familiar plants, all resembling the grasses, yet differing from them in essential particulars. The greater part of them have solid stems, called culms, around which the leaves form a closed sheath. The flowers are in spikes, have no calyx or corolla, and possess three stamens. The stem leaves, when present, are three-ranked, and the stems sharply angled. The fruit is one-seeded and forms what is technically known as an achene. The small beaked nutlets heaped up in the centre of a buttercup, will give an idea of an achene as it occurs in a totally different order of plants. Sedges may be regarded as weeds in every sense of the term, and their prevalence is an indication of swampy and poor ground. Unlike grasses, they are quite devoid of nutritious properties as a rule, and are shunned by animals when any thing else is obtainable. Independent of their occasional use in the manufacture of baskets, they have scarcely any economic value. The papyrus of the Nile, from which paper and boats were made, is a somewhat famous exception to their general uselessness. Unfit though they may be to minister in any way to the benefit of man, they are yet, in their infinite variety and exceeding grace, most charming to any one whose attention has been once directed to them.

Let us now pass to the grasses. Bearing in mind the several points of the above description, let us see how these differ from their near relations. Put them side by side and compare them. It will be seen that the grasses, unlike the sedges, have hollow stems swollen and closed at the joints, with two-ranked leaves, having many fine veins running parallel to the central vein or mid-rib, and split sheaths, the tops of which are prolonged into an appendage known as a "ligule," from a Latin word signifying a shoe-strap. The flowers are arranged in spikes as in the timothy (Phleum), or in panicles as in the bent grass (Agrostis). These spikes and panicles differ greatly as to their concentration or diffusion, and the flowers themselves as to their appendages. Some are armed with long awns or bristles as in the barley and oats—and we wish here to testify that these are about as awkward things to swallow as in our juvenile days we ever tried. The stamens are usually three, with anthers or pollen cases attached only by one point, and therefore swinging freely. The styles are mostly two, with feathery stigmas which form charming micros-

copic objects. In common with sedges, the grasses have fibrous roots. To describe the flowers, without the use of actual specimens or drawings, is a difficult matter. Let the following quotation supplement the above remarks:

"A few rudimentary leaves collected at the ends of the branches of inflorescence and constituting flowers, a very small number of stamens inclosed in a thin pericarp [skin or walls of the fruit], are all that nature provides to enable these plants to preserve their race and to distinguish their numerous kinds from one another. Yet with such a simple apparatus, many thousand species are so precisely characterized, that the natural order of grasses is perhaps one of the easiest to study and arrange, provided the task be commenced upon right principles."

There is, despite the above statement, scarcely an order more dreaded by the young student. It is a good test of his love for science and severe application, if he persistently investigates it. It contains three thousand or more species generally diffused over the earth.

With us, the plants are usually small and grow close together, forming a mat, though even here there is much diversity in the habit of growth, the Aira or hair-grass, for instance, forming isolated clumps. In the tropics the plants are often much larger —the bamboo sometimes attaining a length of ninety feet—and there is little or no tendency to form a sward.

It is useless to speak of the value of the grass family to man. It is enough to say that it produces all the cereal grains, most of the forage plants, the valued sugar-cane, and the bamboo, applied by the natives of the East to such a multiplicity of purposes, that we are led to wonder if they could survive without it. Man by observing processes of nature, has in some cases usefully applied certain species of grass to prevent the encroachments of the sea, the fibrous and interlacing roots serving admirably to bind the shifting sands. No injurious properties are known positively to appertain to the order, except in the case of the darnel (*Lolium tennulentum*), the fruit of which is acknowledged to be pernicious.

Of our common grasses there are many that are beautiful, none more so to our thinking than the wild rice (Zizania), which we have often admired on our northern rivers as it nodded over the passing row-boat. The flowers are larger than usual in this genus, and are elegantly marked with light bands of red. It is curious how

many fanciful resemblances one sees in plants. We were lately quite provoked to find that Winthrop, with whom we certainly never had conversed, had hit upon an idea which we esteemed peculiarly our own. It was the comparison of the heads of timothy to cannon sponges. Many other curious similitudes have been observed, nor has man in his architectural and ornamental workmanship, begun to avail himself of one quarter of the lovely models at all times displayed before him.

If one makes a bouquet consisting alone of grasses, he will soon perceive how beautiful they really are. The panics and herd's grasses are especially lovely, both in the fields, which some of them tinge with their ruddy smoke, and in the vase at home, where their ethereal delicacy can be more closely noted.

The grasses are so numerous that it is impossible to refer even briefly to one quarter of them. We can only give our advice to "go and look them up."

CONTRIBUTIONS TO THE NATURAL HISTORY OF THE VALLEY OF QUITO.—No. I.

BY PROFESSOR JAMES ORTON.

THE Geographical Distribution of organized beings is one of the unfinished chapters of natural history. Much has been done within the last twenty years in defining zoological and phytological provinces; but we are still very far from knowing the precise range of species. This has arisen partly from the failure of collectors to give exact localities, and partly from the ignorance of home naturalists, who often confound places hundreds of miles distant. The vast collections of Fraser, *e. g.*, are of little use in determining distribution, as in many cases the indefinite habitat, "Andes of Ecuador," is given, which may mean the Pacific slope, the headwaters of the Amazon, or the Quito Valley—three regions quite distinct in physical aspect.* On the other hand, those who determined his specimens have in some cases located them indiscrimi-

*The term *Andes* strictly belongs to the Eastern range, and *Cordillera* to the western; but this distinction is not always observed.